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## First record of *Ribes uva-crispa* L. (Grossulariaceae) from the Madonie Mts., a new species of the Sicilian flora

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### Abstract

In this study, a first record of *Ribes uva-crispa* L. (Grossulariaceae) – a new species of the Sicilian flora – from the Madonie Mts. is reported. The autochthonous and relict new population of *Ribes uva-crispa* L. (Grossulariaceae) is found on Mount Carbonara (Madonie Mts., North-Central Sicily), which is several hundred kilometers away from the Central Apenninic and the South Mediterranean locations of its distribution range. *R. uva-crispa* shows a distribution similar to other taxa extending from the Euro-Asiatic area to the mountains of North Africa with disjunct populations on the main Sicilian reliefs (Madonie and Nebrodi Mts.), testifying ancient phytogeographical connections. This noteworthy record adds a new species – as well as a new genus and new family – to the vascular flora of Sicily. Based on the morphological characters, the population found is to be referred to *Ribes uva-crispa* L. subsp. *austro-europaeum* (Bornm.) Bech var. *glanduligerum* (Lindberg) Maire.

**Keywords:** Conservation of species, Grossulariaceae, Madonie Mts., *Ribes uva-crispa* subsp. *austro-europaeum*, Sicily

### Introduction

The genus *Ribes* L. (Grossulariaceae) includes approximately 150 species of deciduous shrubs, both unarmed and thorny, distributed in the temperate and cold zones of Northern Hemisphere and South America (Sponberg 1972; Sinnott 1985; Schultheis & Donoghue 2004). Among the taxa occurring in Italy, *Ribes uva-crispa* L. s.l. is distributed only in the Alps and in the Apennines up to Abruzzo and Molise; it is reported as doubtfully occurring for Basilicata (Conti et al. 2005). Its distribution area includes the Euro Siberian Region and some reliefs of the Iberian Peninsula, France, British Isles, southern part of Scandinavian Peninsula, regions surrounding the Baltic Sea, Ukraine, Romania (Carpathians), Balcanic Peninsula, with outposts around the Black Sea basin, Greece and Crete. Besides, isolated sites are located in the Central Asia mountains (in the South up to Himalaya), China and North Africa, in the Atlas Mountains (Morocco) and Algeria (Jalas et al. 1999).

A new autochthonous population of *Ribes uva-crispa* has been found in a restricted area on the Madonie Mts. This important finding leads to the discovery of a new species – as well as a new genus

and new family: the Sicilian vascular flora. The same taxon (sub *R. grossularia* L.) appeared in an ancient record of Lojacono-Pojero (1909), near Prizzi (Sicani Mts.), on the basis of specimens picked “*inter vineas*”, probably from cultivated plants, but this has not been confirmed by other authors.

### Materials and methods

Several field researches were carried out in the Madonie Mts. between 2007 and 2010. Morphological, autecological and vegetational aspects of the new population of *Ribes uva-crispa* were investigated. Nomenclature adopted follows Pignatti (1982), while for critical taxa Conti et al. (2005) and Giardina et al. (2007) were followed.

The distribution map of *Ribes uva-crispa* s.l. (Figure 1) was realized on the basis of data reported by Bolòs and Vigo (1984), following the model proposed in *Atlas Florae Europaeae* (Jalas et al. 1999), integrated with references to the extra European localities of Morocco (Ball 1878; Maire 1980; Fennane et al. 1999; Valdés 2002), Algeria (Maire

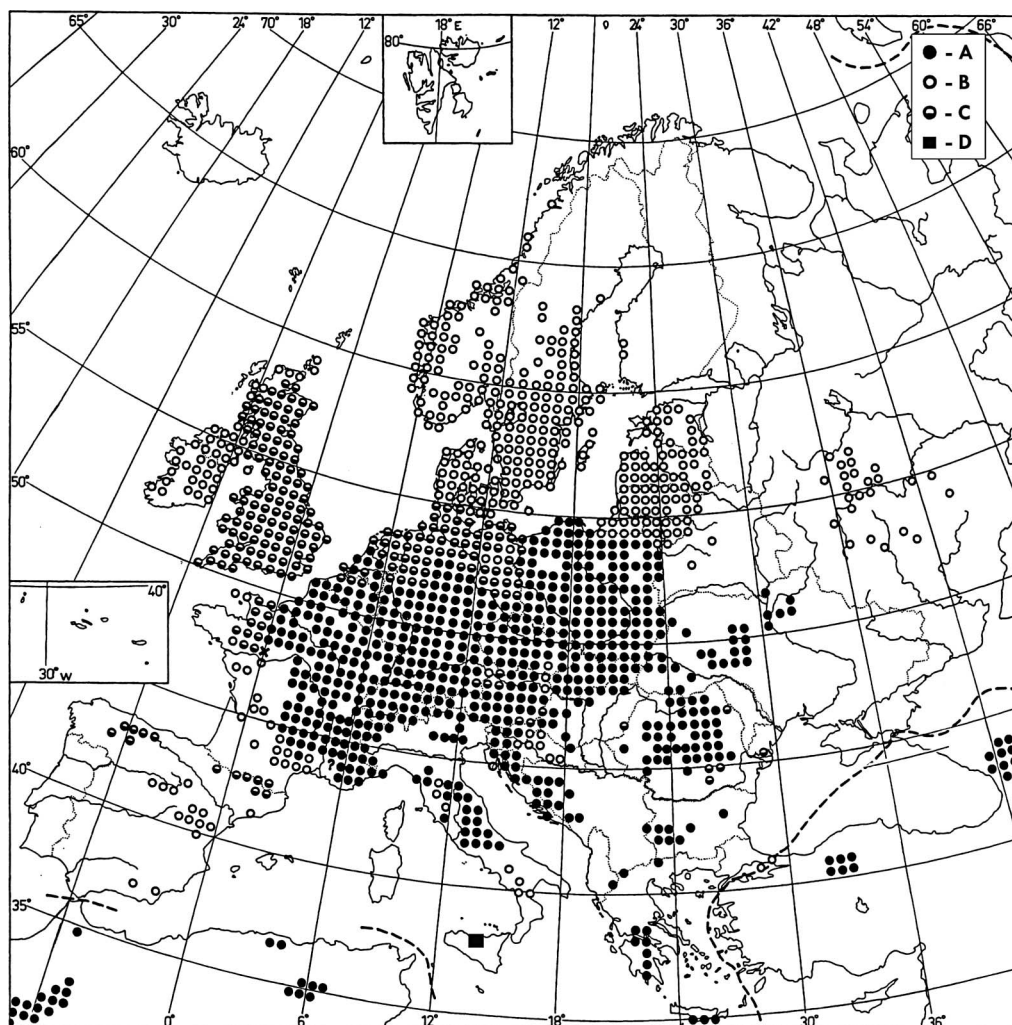


Figure 1. Distribution of *Ribes uva-crispa* s.l. in Europe and in the Mediterranean area, reproduced from Jalas et al. (1999; by permission on the Committee for Mapping the Flora of Europe and Societas Biologica Fennica Vanamo) and integrated: (A) native occurrence, (B) introduction, half circle (C) status unknown or uncertain, (D) new record in Sicily.

1980), North-East Anatolia, Northern Iran (Davis 1972) and Caucasus (Grossgeim 1950).

## Results and discussion

### Site description

The population of *Ribes uva-crispa* L. found in Madonie Mts. is restricted to a limited area along the western flank of Mount Carbonara (Figure 2A), between 1370 and 1400 m a.s.l., in the lower belt of *Fagus sylvatica* L. forests (Raimondo 1980; Brullo 1984; Raimondo et al. 1994b, 1996, 2000). It consists of 40–50 species scattered in 300–350 m<sup>2</sup> of surface, on colluvial sediments and humiferous soil developed on Upper Triassic–Middle Cretaceous calcareous-dolomitic debris cones (Lentini & Vezzani 1978). According to the bioclimatic classification of Rivas-Martinez (2004), this area is

characterized by a supra-Mediterranean upper humid bioclimate, frequently influenced by wet and cool air coming from the Tyrrhenian Sea.

### Taxonomic treatment

*Ribes uva-crispa* L. s.l. is a highly variable species, divided into many subspecies and varieties that need critical studies (Strid & Tan 2002). Based on the morphological characters and according to *Flore de l'Afrique du Nord* (Maire 1980), *Flora Iberica* (Castroviejo et al. 1997) and *Flora Hellenica* (Strid & Tan 2002), the population found is to be referred to subsp. *austro-europaeum* (Bornm.) Bech. This taxon is distributed in the Mediterranean mountains, and is now recorded from Iberian Peninsula, Northern Africa (Algeria and Morocco), central part of Italian Peninsula, Greece and probably in Turkey and Caucasus.

***Ribes uva-crispa*** L. subsp. *austro-europaeum* (Bornm.) Bech. in Repert. Spec. Nov. Regni Veg. 27: 228 (1929). [= *R. grossularia* L. subsp. *austro-europaeum* Bornm. in Repertorium specierum novarum regni vegetabilis, vol. XXV: 341 (1928); = *R. g.* L. var. *microphylla* Lange in Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1881: 101 (1882)].

**Description.** *Ribes uva-crispa* L. is a shrub that grows up to 0.5–1.5-m, with many curved and intricate branches and short internodes. The twigs are initially green and pubescent, with 1–3 silky spines at each node, become thorns at 9–14 mm on old branches (Figure 2C). The bark is greyish detaching in plates.

The leaves are sub-rotundate, truncate to subcordate at base (15–30 × 18–30 mm in length), with dense pubescence on both surfaces and on the prominent veins; lobes 3 (–5), extending approximately halfway to base, broadly oblong to obovate, crenato-serrate. The petiole is 5–15 mm long and villous. The flowers are axillary, solitary or in clusters of 2–3, hermaphrodite (Figure 2B). The peduncles are 6–12 mm long, densely pubescent for simple or glandular hairs, the latter mainly close to the receptacle. Sepals reflexed, up to approximately 6–7 mm, purple or purple-green, more or less intense especially at the apex and margins; petals white, 1–2.5 mm long much shorter than the sepals; stamens 5, straight, 5–6 mm long, with oval anthers; ovary inferior, pyriform, hairy, with cylindrical styles. Fruits approximately 10 mm, broadly ellipsoid to sub-globose, greenish-yellow or slightly red, usually densely glandular-hispid (Figure 2D), becoming glabrous at maturity; fruiting pedicel 5–9 mm long.

**Phenology.** During our survey (2008–2010), abundant flowering from mid April to mid May was observed, followed by poor fruiting.

**Notes.** A high infraspecific variability was emphasized by Maire (1980), who distinguished within *Ribes uva-crispa* subsp. *austro-europeum* three varieties: var. *atlanticum* Ball., with receptacle and berry glabrous; var. *subatlanticum* Maire, with receptacle and berry covered with glandular hairs; and var. *glanduligerum* (Lindberg) Maire, with receptacle and berry bristly for glandular hairs, long hairs spread accompanied by simple, fine shorter. Based on the morphological characters, the population found on the Madonie Mts. is to be referred to the latter variety.

#### *Vegetation remarks*

In the investigated area of Madonie Mts., *Ribes uva-crispa* L. subsp. *austro-europaeum* (Bornm.) Bech.

var. *glanduligerum* (Lindberg) Maire is a member of orophilous deciduous shrubby communities at the edge of woods dominated by *Acer pseudoplatanus* L. and *Acer monspessulanum* L., to which it is dynamically linked. From a phytosociological viewpoint, these maple-woods can be referred to the *Sorbo graecae-Aceretum pseudoplatani* Gianguzzi & La Mantia 2004 (*Quercus-Fagetum* Br.-Bl. 1937 & Vlieger in Vlieger 1937), endemic association restricted to the Rocca Busambra and Madonie Mts., where it characterizes an edapho-series typically found on the consolidated part of debris cones (Gianguzzi & La Mantia 2004).

Within the class *Rhamno catharticae-Prunetea spinosae* Rivas Goday & Borja ex Tuxen 1962, *Ribes uva-crispa* L. s.l. is considered to be a characteristic species of *Prunetalia spinosae* Tuxen 1952 (Pirone 1995), order that includes mesophyllous pioneer shrub lands typical of hill and mountain vegetation belts (Pignatti et al. 1980). Particularly, in this area the entity is associated with other shrubs, such as *Prunus mahaleb* L. subsp. *cupaniana* Guss., *Lonicera xylosteum* L., *Rhamnus catharticus* L., *Rosa sicula* Tratt., *Rubus canescens* DC., *Rosa canina* L., *Hedera helix* L., *Clematis vitalba* L., *Euonymus europaeus* L., *Sorbus aria* (L.) Crantz subsp. *cretica* (Lindl.) Holmboe, *Acer monspessulanum* L., *Acer pseudoplatanus* L., *Acer campestre* L., *Berberis aetnensis* C. Presl, *Sambucus nigra* L., *Ilex aquifolium* L., *Fraxinus ornus* L., etc. Among herbaceous species the most frequent are *Thalictrum calabricum* Spreng., *Cyclamen repandum* Sm., *Lamium flexuosum* Ten. var. *pubescens* (Sibth.) Caruel, *Cerastium tomentosum* L., *Opopanax chironium* (L.) W.D.J. Koch, *Arabis alpina* L. subsp. *caucasica* (Willd. ex Schldt.) Briq., *Cardamine graeca* L., *Geranium pyrenaicum* Burm., *Geranium purpureum* Vill., *Geranium lucidum* L., *Rumex scutatus* L., *Hesperis cupaniana* Guss., etc.

Based on the several species checked, the coenosis is probably to be referred to residual orophilous communities to *Prunetalia spinosae* order (Cutini et al. 2002; Poldini et al. 2002), isolated in Sicily, at the extreme South of Apennine chain (Gianguzzi et al. 2009).

#### *Phytogeographical significance of the new record*

In Sicily, the Madonie Mts. – culminating at the top of Mount Carbonara (1979 m) – is a mountain range of extreme interest for its geological nature (Lentini & Vezzani 1978) and paleogeographical history (Bertolani Marchetti et al. 1984). These reliefs represent a link between the African Continent and the Italian Peninsula, and constitute a refuge area for several floristic elements, remarkable to understand the evolution of the Mediterranean vegetal landscape (Pignatti et al. 1980; Raimondo 1984). In several





Figure 2. A: View of the western flank of Mount Carbonara (Madonie Mts.); B: twig of *Ribes uva-crispa* subsp. *austro-europaeum* with a flower; C: detail of big thorns in old branches; D: young fruit glandular-hispid.

cases, entities showing distribution more or less extended, are present in Sicily only in this territory (Brullo et al. 1995; Giardina et al. 2007). Some of these are endemic species common to the Italian Peninsula [*Cardamine montelluccii* Brill-Catt. & Gubellini, *Minuartia graminifolia* (Ard.) Jav. subsp. *rosani* (Ten.) Mattf., *Ptilostemon niveus* (C. Presl) Greuter], while other elements show Central-Mediterranean [*Buglossoides incrassata* (Guss.) I. M. Johnst.], Northern-Mediterranean [*Cotoneaster nebrodensis* (Guss.) C. Koch, *Cynoglossum nebrodense* Guss., *Ferulago campestris* (Besser) Grecescu, *Minuartia recurva* (All.) Schinz & Thell. subsp. *condensata* (C. Presl) Greuter & Burdet], Eastern-Mediterranean [*Cerinth minor* L. subsp. *auriculata* (Ten.) Domac], Western-Mediterranean [*Arenaria grandiflora* L. subsp. *grandiflora*, *Artemisia alba* Turra] and Southern-Mediterranean distribution [*Herniaria permixta* Guss., *Vicia glauca* C. Presl]. Taxa with wider distribution are *Campanula trachelocalycina* Ten., *Carex laevigata* Sm., *C. pallescens* L., *C. viridula* Michx. subsp. *oedocarpa* (Andersson) B.

Schmid, *Chenopodium bonus-henricus* L., *Colchicum triphyllum* G. Kuntze, *Daphne oleoides* Schreber, *Silene pusilla* Poir. *Thesium parnassi* A. DC., *Thlaspi rivale* C. Presl, as well as *Ribes uva-crispa* subsp. *austro-europaeum*.

The integrity of the site – one of the best preserved biotopes of the Madonie Mts. – allows to suppose that the new finding is an autochthonous and relict population, albeit punctiform. It is very interesting also for the phytogeographical characterization of the Madonie area and Sicily in general, because it is several hundred kilometers away from nearest sites of the species, i.e. Central Apennines and Algeria.

In Sicily, *Ribes uva-crispa* subsp. *austro-europaeum* is probably related to the palaeohistory of other orophilous taxa with a similar chlorotype, which includes Euro Siberian Region, North-African reliefs and more or less isolated sites in the upper part of Nebrodi and Madonie Mts., as a heritage of ancient phytogeographical connections. This is the case of *Ilex aquifolium* L., *Daphne laureola* L., *Acer*

*monspessulanum* L., *Taxus baccata* L., *Berberis vulgaris* L. s.l., *Utricularia australis* R. Br., *Lonicera xylosteum* L., etc.

### Conservation issues

Based on our survey and according to the IUCN categories, the population investigation of the *Ribes uva-crispa* is to be included in the long list of “critically endangered” taxa, together with other peculiar elements of Madonie Mts., as *Abies nebrodensis* (Lojac.) Mattei, *Adenostyles nebrodensis* Strobl, *Androsace elongata* L. subsp. *breistofferi* (Charpin & Greuter) Molero & Montserrat, *Peucedanum nebrodense* (Guss.) Strobl, *Hypericum androsaemum* L., etc. (Raimondo et al. 1994a; Conti et al. 1997).

There are several threats to be mentioned, all linked to the exiguity of the population, whose habitat is also subject to heavy erosion, given the steepness of the slopes and the instability of the detritic cones.

During our research in the last 3 years, we have observed a low percentage of fruiting individuals in this site and, consequently, a reduced seed reproduction. However, we have ascertained a significant vegetative propagation, particularly from radical sprouts.

Another serious threat is the grazing by wild animals (goats, fallow deers and boars) on leaves and young shoots. In the late spring, a complete defoliation and remarkable damages to all plants of *Ribes uva-crispa* in the site has been observed.

Considering the remarkable importance of this new finding from the floristic and phytogeographical viewpoint, we emphasize the need of a careful protection of this newly discovered population, as well as the opportunity of reintroducing *Ribes uva-crispa* subsp. *austro-europaeum* var. *glanduligerum* in other suitable sites of the Madonie Mts., and the start of an *ex situ* conservation project.

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